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By: Charles B. Helinski

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

E. HELINSKI :

SERIAL NO. 09/113,712 :

FILED: JULY 10, 1998 :

Art Unit: 3724

FOR: CONCENTRIC :

Examiner: C. Dexter

ALIGNMENT AND :

DEVICE FOR DIES AND :

DIE STRIPPER :

Hon. Commissioner of Patents

And Trademarks

Washington, D.C. 20231

BRIEF ON APPEAL

Sir:

REAL PARTY IN INTEREST

The real party in interest is International Business Machines Corporation.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF ALL CLAIMS

Claims 1-24 are pending. In the Final Rejection dated January 30, 2001, the Examiner indicated that claims 12-24 were withdrawn from consideration. The Office Action itself, however, included claims 21 and 22 in the rejection along with the rejection of claims 1-11. It is therefore assumed that claims 21-22

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are included along with finally rejected claims 1-11 as part of the group of claims on appeal.

STATUS OF AMENDMENTS

An amendment, is being concurrently filed with respect to claims 6 and 7. The amendment to claim 6 is for the sake of completeness to point out that the first die receiving passage receives at least a portion of the first die. Claim 7 is amended for proper grammar to replace "receive" with "receives". It is assumed that these amendments will be entered.

SUMMARY OF THE INVENTION

The present invention relates to a system for mechanically punching holes in substrates and is particularly useful for punching holes in thin films for use in the electronics industry. More particularly, the present invention relates to a device for aligning punches in dies for mechanically forming holes in substrates.

The following discussion of the invention is with respect to the drawings. It should be understood that the reference to the drawings is for the purpose of facilitating an understanding of the invention and is not intended to be limiting as to the scope of the claims.

As defined in parent claim 1, the punch and die alignment system comprises a first die 25 having an aperture 40 for receiv-

ing a punch 27. A second die 26 includes an aperture 50 for receiving the punch. The system also includes a first housing 32 having a passage 35 which receives at least a portion of the first die 25. A second housing 33 includes a passage 34 which receives at least a portion of at least the first die 25 and the second die 26. The second die passage 34 is configured to permit at least one of the first die 25 and second die 26 to rotate in that passage thereby permitting the first die aperture 40 and the second die aperture 50 to be aligned with each other.

Such alignment is particularly advantageous since often punches and dies have extremely small clearances and tolerances. If the desired clearance is not achieved edges of the punch may interfere with the cutting dies. Interaction between the punch and dies may result in undesirable forces which may cause chipping of the punch and/or dies. In some instances portions of the substrate could be pinched between the punch and die resulting in damage, such as deformation or material removal, from the substrate being punched. Substrate material may also be more likely to interfere with movement of the punch and may clog the punch receiving opening in the dies. The present invention permits the die apertures to be arranged relative to each other as optimally close as concentrically permitted by the dies and the housings. This results from being able to rotate at least one of the dies relative to each other. As a result, alignment of the die

apertures so as to be concentric may be within about five millionths of an inch.

Parent claim 6, the only other independent claim is similar to claim 1 but also includes the feature of the second die passage being configured to receive portions of both dies. By having the second die passage configured to receive both portions of the second die and of the first die, the second die passage functions as an initial alignment structure for aligning the first die with the second die and correspondingly then permitting the final alignment of the two die apertures by any rotation that might be necessary.

Various dependent claims recite other advantageous features of the invention such as the provision of alignment marks 52 on the dies to align the die apertures (claims 4 and 9), or the degree of alignment which is achieved (claims 5 and 10), or the provision of a compression spring to bias the punch to a retracted position (claim 11), or the housings being rotatable relative to each other (claims 21 and 22).

ISSUES

The issues are:

Whether claims 1-3 and 6-8 are unpatentable under 35 USC § 102(b) as anticipated by Kranik, et al. U.S. Patent No. 4,425,829 ("Kranik") or, in the alternative, under 35 USC § 103(a) as

obvious over Kranik in view of Shimizu, et al. U.S. Patent No. 5,214,991 ("Shimizu"); and

Whether claims 4-5, 8-9 [sic 9-10], 11 and 21-22 are unpatentable under 35 USC § 103(a) over Kranik or in the alternative over Kranik in view of Shimizu.

GROUPING OF CLAIMS

Appealed claims 1-11 and 21-22 are set forth in the attached Appendix. Claims 6 and 7 are in the form amended by the amendment after final.

Claims 1 and 3 may be grouped together and thus stand or fall together.

Claims 2 and 6-8 may be grouped together.

Claims 4 and 9 may be grouped together.

Claims 5 and 10 may be grouped together.

Claim 11 is grouped alone.

Claims 21 and 22 may be grouped together.

ARGUMENT

I. THE REFERENCES

Kranik was relied upon as the basic reference in rejecting all of the claims. Kranik discloses a punch apparatus which in terms of the claims includes a first die or member terminating in surface 28. The first die has an aperture illustrated in Figure 1 with the tip 30 disposed in the aperture for receiving the tip

30 of punch element 16. A second die or bushing 48 includes a second die aperture 50 for receiving the tip 30 of punch element 16. A first housing or stripper plate 14 has a passage which receives the first die previously noted. A second housing or substrate support 42 has a passage which receives the second die or bushing 48. As shown in Figure 1 the bushing terminates at the outer surface of substrate support 42. Kranik makes no disclosure of the passage for the second die or bushing 48 receiving any portion of the first die. Kranik makes no disclosure of either the first die or the second die being able to rotate. Since there is no plan view of the Kranik apparatus there is no express disclosure that the dies or passages are round or circular in cross-section.

Shimizu relates to a punching apparatus and was relied upon with regard to its disclosure of round dies fitted into round die passages.

II. CLAIM GROUPINGS

A. Claims 1 and 3

1. Claimed Invention

Parent claim 1 defines a first die having a first die aperture for receiving a punch with a second die including a second die aperture for receiving the punch. A first housing includes a first die passage receiving at least a portion of the first die. A second housing includes a second die passage receiving at least a portion of at least one of the first die and the second die. A key feature of claim 1 is that the second die passage is configured to permit at least one of the first die and the second die to rotate thereby permitting the first die aperture and the second die aperture to be aligned. Claim 1 broadly does not require the first die to extend into the second die passage. The desired alignment is achieved by having at least one of the first die or the second die being able to rotate for aligning the die apertures.

Since claim 3 is dependent on claim 1 and is grouped with claim 1 the features added by claim 3 will not be discussed.

2. Rejection

Claims 1 and 3 were rejected under 35 USC § 102(b) as anticipated by Kranik or in the alternative under 35 USC § 103(a) as obvious over Kranik in view of Shimizu. With respect to claim 1 the Examiner concluded that the second die is configured to permit at least one of the first die and the second die to rotate

therein" which the Examiner "interpreted as defining the second die passage as being round thus permitting rotation therein". The Examiner addressed the possibility of an argument that there is no disclosure of the second die passage being round and took "Official notice that round dies fitted into round die passages are old and well known in the art as evidenced by Shimizu". The Examiner then concluded "it would have been obvious to one of ordinary skill in the art to make the second die passage as well as the second die of Kranik, et al. round for the well known benefits including those described above".

In responding to applicant's arguments the Examiner addressed the argument "that in the prior art, the dies (die bushings) are tightly pressure fitted for receiving passages and thus could not be rotated within the die receiving passages. However, the Examiner respectfully submits that this appears to be no different than the claimed invention." The Examiner then referred to Figure 2 of the present application with the conclusion "that the upper die and lower die must be pressure fit into their respective die passages else they would slide through the passages and would be useless".

3. Response to Rejection

Kranik is clearly silent as to the feature of providing a structure which permits at least one of the first die and the second die to rotate so as to obtain a desired alignment of the two die apertures. To overcome this lack of disclosure by Kranik

the Examiner resorts to inferences and conclusions. The Examiner first assumes that although not expressly disclosed in Kranik the dies and die passages would be round. To support this conclusion the Examiner relies upon Shimizu. Even assuming, however, that the Kranik dies and die passages are round, there is still no teaching of structuring the relationship between those elements so as to permit rotation of at least one of the dies in the second die passage. It is not enough that the dies and die passages are round, there must be more; namely the fit between the die passage and at least one of the first die or second die must be such so as to permit rotation. The Examiner does not really challenge the argument that in the prior art the dies are tightly pressure fitted in their receiving passages and thus could not be rotated. Instead, the Examiner in essence equates what is illustrated in Figure 2 of the present application as being the same as what is practiced in the prior art. This conclusion, however, overlooks the basic feature of the invention; namely, that there is sufficient clearance to permit rotation. Such clearance is possible wherein rotation can be achieved but a free sliding of the die does not necessarily result. The claims clearly state that the relationship between the second die passage and at least one of the first die and second die is such that the rotation is achieved. The specification repeatedly states that the die passage is configured with respect to the dies to permit rotation of at least one

of the dies. Accordingly, equating the claimed invention which require the ability to rotate to the prior art which does not provide for such rotation is completely contrary to what is claimed in Claim 1 and described in the specification. The Examiner should therefore be reversed in his rejection.

B. Claims 2 and 6-8

1. Claimed Invention

These claims are similar to claim 1, but also include the feature of the second die passage receiving at least a portion of the second die and being configured to receive at least a portion of the first die (claims 2 and 6) or all of the second die and at least a portion of the first die (claim 7). By having the second die passage receive portions of both the first and second dies, the second die passage provides an initial alignment of the dies prior to any rotation for precise alignment of the die apertures.

2. Rejection

Claims 2 and 6-8 were coupled with claims 1 and 3 and rejected under 35 USC § 102(b) as anticipated by Kranik or in the alternative under 35 USC § 103(a) as obvious over Kranik in view of Shimizu. The references were combined as discussed with respect to claim 1. With regard to the feature of both portions of the first die and the second die being received in the second die passage the Examiner concluded that since the passages in Kranik are of the same size, the first die "can clearly be

received in the second die passage if the second die is moved downwardly within the second die passage".

3. Response to Rejection

The difficulty with the hypothesis made by the Examiner is that it is contrary to what is disclosed in Kranik. Figure 1 clearly shows the bushing 48 to have its outer end coplanar with the outer surface of the substrate support 42. Since the bushing 48 is not recessed below the outer surface there is no space to receive the end of the first die, i.e., the surface 28 shown in Figure 1 of Kranik. The distance that surface 28 extends below stripper plate 14 is equal to the combined thickness of sheet 44 and mask 46. There is simply no disclosure of moving the bushing 48 downwardly within its passage so as to receive the other die. Likewise there is no motivation to modify Kranik so as to result in that structure. Accordingly, the Examiner should be reversed in his rejection of claims 2 and 6-8.

C. Claims 4 and 9

1. Claimed Invention

Claim 4 is dependent on claim 1 and claim 9 is dependent on claim 6. Each claim adds to its parent claim that an alignment mark is provided on each of the first die and the second die so that the alignment marks can be aligned to result in alignment of the first die aperture and the second die aperture.

2. Rejection

Claims 4 and 9 were rejected under 35 USC §103(a) as unpatentable over Kranik or in the alternative over Kranik in view of Shimizu. In rejecting these claims the Examiner recognized that Kranik "lacks alignment marks on the respective dies", but "However, the Examiner takes Official notice that it is old and well known in the art, particularly the manufacturing art, to custom manufacture cooperating components and to provide alignment marks on the components to facilitate the desired alignment of the components. Therefore, it would have been obvious of one having ordinary skill in the art to provide alignment marks on the dies of Kranik."

3. Response to Rejection

The Examiner admits that Kranik lacks the alignment marks on the respective dies as recited in claims 4 and 9. The conclusion by the Examiner, however, that it is old and well known in the art to provide such alignment marks overlooks the purpose of those marks with regard to the claimed invention. It is because at least one of the dies may rotate that the alignment marks are important. Because of the rotation, positioning of the alignment marks with respect to each other is possible so that if there is misalignment the rotation could permit the alignment marks to be aligned. Kranik has no disclosure nor is there any motivation in Kranik to provide for rotation of either of the dies. What motivation then would there be to provide alignment marks when

adjustment between the marks is not possible? Accordingly, the reasoning by the examiner as to the obviousness of modifying Kranik so as to hypothetically include the claimed alignment marks is improper since there is no suggestion or motivation for such modification of Kranik, nor would there be any practical purpose achieved by such hypothetical modification. Accordingly, the Examiner should be reversed in his rejection of claims 4 and 9.

D. Claims 5 and 10

1. Claimed Invention

Claim 5 is dependent on claim 1 and claim 10 is dependent on claim 6. Each of these claims defines the alignment to be "within about 5 millionths of an inch".

2. Rejection

In Paragraph 7 of the Office Action the Examiner grouped together claims 4-5, 8-9, 11 and 21-22. It is assumed that the Examiner had meant this grouping to be claims 4-5, 9-11 and 21-22 because claim 8 was the subject of the rejection in Paragraph 6 of the Office Action. With that assumption claims 5 and 10 were rejected under 35 USC § 102(a) as being unpatentable over Kranik or in the alternative over Kranik in view of Shimizu. The Examiner recognized that Kranik "lacks a specific disclosure of the alignment and accuracy of the die apertures". The Examiner dismissed this feature, however, by simply concluding that "it would have been obvious to one of ordinary skill in the art...to

provide an accurate alignment of the die apertures for the well known benefits including that described above."

3. Response to Rejection

The Examiner's rejection overlooks that a main benefit of the claimed invention is in achieving a high degree of accuracy. This is at least in part the result of the structure of the parent claims regarding the ability to rotate at least one of the dies. In the absence of any disclosure in the prior art of achieving that degree of accuracy defined in claims 5 and 10, it is unreasonable for the Examiner to conclude that such defined accuracy is part of the prior art. Accordingly, the Examiner should be reversed in his rejection of claims 5 and 10.

E. Claim 11

1. Claimed Invention

Claim 11 is dependent on claim 6 and defines the assembly of claim 6 as further comprising a compression spring engaging the punch and one of the housings to bias the punch to a retracted position.

2. Rejection

Claim 11 was rejected under 35 USC § 103(a) as being unpatentable over Kranik or in the alternative over Kranik in view of Shimizu. With regard to claim 11 the Examiner stated that Kranik discloses a compression spring, but recognized that Kranik "lacks the particular relationship between the spring, the punch and the housings. However, the Examiner takes Official

notice that it is old and well known in the art to provide compression springs in any one of various known configurations to provide a biasing force to a punch. Therefore, it would have been obvious to one having ordinary skill in the art to provide the particular relationship between the spring, the punch and the housings as an alternative configuration for biasing the punch based on known considerations such as manufacturing considerations.

1. Response to Rejection

Although the Examiner recognized that Kranik lacks the claim structure of claim 11, the Examiner simply dismissed that structure as being old and well known. The difficulty with this position is that the Examiner cites no secondary prior art which discloses a compression spring engaging a die punch and a die housing to bias the punch to a retracted position. If such feature is so old and well known surely there must be some prior art disclosing that feature. But, even if there is such prior art, the Examiner shows no motivation to modify Kranik so as to result in the claimed structure. Accordingly, the Examiner should be reversed in his rejection of claim 11.

F. Claims 21-22

1. Claimed Invention

Claim 21 is dependent on claim 1 and claim 22 is dependent on claim 6. Each dependent claim defines the first and second housings as being rotatable relative to each other, in addition

to at least one of the dies being rotatable as recited in the parent claims.

2. Rejection

Claims 21 and 22 were rejected under 35 USC § 103(a) as being unpatentable over Kranik or in the alternative over Kranik in view of Shimizu. With regard to claims 21 and 22 the Examiner simply concluded "the Examiner takes Official notice that it is old and well known in the art to provide punch and dies each in respective housings which are movable relative to each other for various reasons including to repair and/or replace one of the punch or dies without removing the other. Therefore, it would have been obvious to one having ordinary skill in the art to make the upper and lower housings movable relative to one another for the well known benefits including that described above."

3. Response to Rejection

The Examiner again attempts to compensate for the lack of structure in the cited references by making a general reference to what is old and well known in the art without referring to any specific prior art as exemplifying such features and without showing why there would be motivation to modify the Kranik arrangement to incorporate such features. As discussed with respect to the feature of the first and/or second die itself being rotatable, there is simply no disclosure in nor any reason upon which there would be motivation from Kranik to make the die


housings rotatable with respect to each other. Accordingly, the Examiner should be reversed in his rejection of claims 21 and 22.

III. CONCLUSION

In view of the above the Examiner should be reversed in his rejections.

Respectfully Submitted,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

SERIAL NO. 09/113,712

: Art Unit: 3724

: Examiner: C. Dexter

ALIGNMENT AND DEVICE FOR DIES AND DIE STRIPPER

APPENDIX

1. A punch and die alignment system, comprising: a first die including a first die aperture for receiving a punch; a second die including a second die aperture for receiving the punch; a first housing including a first die passage receiving at least a portion of the first die; and a second housing including a second die passage receiving at least a portion of at least one of the first die and the second die, the second die passage being configured to permit at least one of the first die and the second die to rotate therein, thereby permitting the first die

- aperture and the second die aperture to be aligned with each other.
2. The punch and die alignment system according to claim 1, wherein the second die passage receives at least a portion of the second die and at least a portion of the first die.
 3. The punch and die alignment system according to claim 1, wherein the first die passage and the second die passage are configured to permit at least the first die to rotate therein.
 4. The punch and die alignment system according to claim 1, further comprising: a first alignment mark on the first die; and a second alignment mark on the second die; wherein alignment of the first alignment mark and the second alignment mark aligns the first die aperture and the second die aperture.
 5. The punch and die alignment system according to claim 1, wherein the first die aperture and the second die aperture are alignable to be concentric within about 5 millionths of an inch.
 6. A punch and die assembly, comprising: a first die including a first die aperture for receiving a punch; a second die including a second die aperture for receiving the punch; a first housing including a first die receiving passage receiving at least a portion of the first

die; a second housing including a second die passage receiving at least a portion of the second die and being configured to receive at least a portion of the first die, the second die receiving passage being configured to permit at least one of the first die and the second die to rotate therein, thereby permitting the first die aperture and the second die aperture to be aligned with each other; and a punch assembly including a punch, wherein the punch extends through the first die aperture and the second die aperture during a punching operation.

7. The punch and die assembly according to claim 6, wherein the second die passage receives all of the second die and being configured to receive at least a portion of the first die.
8. The punch and die assembly according to claim 6, wherein the first die receiving passage and the second die passage are configured to permit at least the first die to rotate therein.
9. The punch and die assembly according to claim 6, further comprising: a first alignment mark on the first die; and a second alignment mark on the second die; wherein alignment of the first alignment mark and the second alignment mark aligns the first die aperture and the second die aperture.

10. The punch and die assembly according to claim 6, wherein the first die aperture and the second die aperture are alignable to be concentric within about 5 millionths of an inch.
11. The punch and die assembly according to claim 6, further comprising: a compression spring engaging the punch and either the first housing or second housing, thereby biasing the punch to a retracted position.
21. The punch and die alignment system of claim 1, wherein said first and second housings are rotatable relative to each other.
22. The punch and die assembly of claim 6, wherein said first and second housings are rotatable relative to each other.

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